which is still ongoing, saw companies computerize their own operations, learning how to take advantage of technology within their own working environment. Much of this effort involved the implementation of office automation capabilities such as word processing and electronic mail. But more significantly, the first era of computerization, spanning over the last four decades, has involved the creation of transaction systems for inventory, purchasing, billing and human resource functions. Basically, we have spent the last 40 years converting many of our paper-based transaction systems to an electronic form.

The second phase is the natural evolution of what we have done — it involves the extension of these transaction systems to customers, clients, business associates, trading partners and others *via* the Internet. With e-commerce, we are finally prepared to begin learning how to link our own computer systems to those with whom we do business.

Electronic commerce is simply the logical and inevitable evolution in the role of computers.

The reality of E-commerce

I am writing this article after having just returned from a holiday in Florida. What was different about this trip was the fact that most of my travel bookings were done online *via* the Internet. Notably, I booked a van with Thrifty *via* their Web site. I reserved three nights at the Cocoa Beach Hilton *via* their corporate Web site. We also booked a vacation home in Orlando for a week, and then arranged for a condo on the Gulf Coast for a few days.

The purpose of telling you this is not to make you envious; what is significant is that in all of these cases, each business, whether large or small, allowed me to conduct a business transaction with them online *via* the Internet. They were fully prepared to conduct electronic commerce with me.

In the case of the vacation home and condo, it was a simple matter of the owners allowing me to conduct a credit card transaction with them *via* the 'Net in order to place a deposit. Yet in the case of Thrifty and Hilton, what was occurring was a bit more significant — both organizations were letting me, the customer, "talk" to their mainframe reservation systems *via* their Web site.

That is, to me, an example of what electronic commerce is all about — an era in which companies are fully prepared to extend the reach of their transaction systems to the customer or to whomever else they might do business with. And from that perspective, what is really happening with electronic commerce is that the transactions that drive our economy are increasingly beginning to occur electronically.

The paperless economy?

It has been a long standing joke that computers will lead us to the era of the "paperless office." Yet anyone knows that as soon as you implement any type of computer technology, you soon have more paper than you can deal with.

Upon returning from our vacation, my wife and I were swamped with all kinds of mail. Bills, invoices, credit card statements, investment summaries — it took a good hour to go through this material. Next week, my wife will take this pile of paper and write a whole bunch of paper cheques to pay the bills, regardless of whether they are personal or business in nature. The rules of the paper-based economy are that it takes time and effort to process the transactions of the day.

Yet in a few cases, she will be able to pay a bill or two via the Web site of our bank. In that case, an electronic transaction will be effected, which will deduct monies from our bank account, transferring it automatically to the payee. It will take but a few seconds to effect an electronic transaction.

Electronic commerce certainly is not a mystery — it is simply the logical and inevitable evolution in the role of computers, as we begin a slow migration from an economy in which business transactions occur *via* paper to one in which electronic transactions are dominant.

Electronic commerce is not new

The concept of electronic commerce has been with us for quite some time, and in fact, has already wrought significant change in certain sectors of the economy. What has happened is that it has suddenly gained a certain prominence, and reality of implementation, given the explosive growth of the Internet.

The pioneers in the field of "e-commerce" are those organizations that became involved with electronic data interchange, or EDI, in the 1980s. They undertook massive efforts to provide for electronic ordering, invoicing and payment, by providing for complex links between the transaction systems of suppliers and customers.

In the auto industry, EDI led to the emergence of "just-in-time inventory," a concept that resulted in massive and structural change throughout the industry. Instead of carrying high levels of inventory, auto companies ordered product as little as a day or even hours before it was required on the assembly line. It shifted costs and responsibilities to suppliers, thus providing auto companies with significant cost savings in the carrying of inventory. It also led to dramatic weakness when any one company could not supply its required components.

Many visionaries involved with EDI in the 1980s saw the future of an economy in which economic transactions are wired together. They saw that the future of

computing — the second wave, as it were — was to be found in an economy in which the reach of business transaction systems was extended to the outside world.

The significance of the Internet

Take a look around your office or company today and you will find that by and large most of the transactions that you undertake are still paper based. You will still see a lot of purchase orders, invoices, cheques and all the other elements of today's paper-based commerce system in place. By and large, there is no doubt that we are still very much a paper-based economy.

The Internet will change all that. It will make the concept of an electronic economy real. The Internet is the backbone to the economy of the 21st century. The Internet is the technology that will inevitably link together every computer system and computer chip on the planet. It allows the extension of any business transaction system to any business or consumer in the world — and by doing so, provides a foundation for electronic commerce.

Consider Hilton or Thrifty. With the emergence of the Internet, their reservation systems are now accessible *via* the Web to anyone on the planet. This is a rather significant development indeed, for it permits them to begin to provide a form of electronic business — electronic commerce — to anyone in the world.

Many sit back and argue that the Internet is not secure. It will never be a robust business system. It has all kinds of problems. Hence, the concept of electronic commerce will remain but an unfulfilled dream.

To those, I say, wake up! Simply put, new hardware, software, standards and initiatives are being established on the Internet so quickly that the Internet of today is completely different from the Internet of yesterday. What is also evident is that with the amount of venture capital that now seems to be flowing into anything Internet-related, the Internet is being propelled forward in ways that we can only begin to imagine. Financial institutions, software companies, governments, business organizations — everyone is scrambling to put in place the technology, standards, procedures and methodologies to provide for electronic commerce.

The Internet has unrelenting momentum. It does not have an off-switch.

The implications of e-commerce

Electronic commerce promises to wreak havoc throughout our economy. Anyone who chooses to remain complacent will have a rude awakening through the next 10 to 20 years as its effects are felt.

I did not use a travel agent in my vacation planning, thus cutting someone out of a commission. Hilton and Thrifty saved significant monies in the performance of the transaction — already, there are those who offer a discount to the customer for Internet based transactions. Competition was increased — I was able to figure out quickly that Thrifty offered me the best deal of some 10 different rental agencies.

From my perspective, electronic commerce is leading to a dramatic and significant restructuring of the transactions that drive our economic systems. As we begin the slow and inevitably shift from a paper-based economy to one in which transactions occur as little electronic blips through the Internet, companies will find that what is really happening is an overall re-engineering of the way that they conduct business. Business-to-business and consumer-to-business transactions *via* the Internet will come to be the rule, rather than the exception.

The implications are significant. Cost savings will begin to lead to pressure on organizations choosing not to participate in e-commerce. The concept of competition will dramatically change, as the Internet extends the reach of a company around the world. Dis-intermediation will wreak havoc as many middlemen discover that their services are no longer needed. New forms of corporate organization will emerge, in which the organization is defined not by its legal structure, but by the reach of its electronic transaction systems.

From my perspective, the Internet and electronic commerce are the foundations of a system that will shake business to the core. In fact, we are on the crest of a huge new wave of computing, in which the computers that business organizations use will reach out to the computers of their customers, suppliers, trading partners and business associates.

The era of inter-organization networking is about to begin, and it is going to happen through the Internet. And with this new era, I would go so far to say that electronic commerce will slowly, and inevitably, lead us to the paperless economy.

Jim Carroll is the author of *Surviving the Information Age*, which addresses issues of coping with technological change. He has co-authored almost 20 other books which have sold some 400,000 copies, including the national best-selling *Canadian Internet Handbook*. He can be reached on the Internet at **jcarroll@jimcarroll.com**, and has an on-line site containing many other articles concerning the Internet on the World Wide Web on the Internet at **www.jimcarroll.com**. He welcomes your comments.

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Washington insiders recognize substantive problems with the government's stance. But there has been no significant change in the government's position, even in the face of bipartisan, concerted and significant opposition by industry, supported by demonstrated, resulting economic loss.

If national consensus cannot be achieved on the global issue of strong encryption, it is important to recognize the fact and concentrate on areas where agreement can be reached. And for electronic commerce to succeed, there is one required element that depends upon strong cryptography, but not necessarily confidentiality: the digital signature.

Without digital signatures, companies are hard pressed to engage in electronic commerce. Businesses require assurance that an electronically signed document can be enforced against the sender. At present, there is no definitive court decision ruling that an electronic document can be "signed" electronically in legal systems and in circumstances where the signature remains as a formal requirement of law.

This "signature" issue is intimately related to a technical, legal issue of proof. In a court case, a party seeking to enforce a contract has the burden of proving that (1) the document was signed by the person who it purports to have come from, and (2) that the document presented is, in fact, the one that was signed. In the context of electronic communications, the burden can be carried if the parties used strong public-key algorithms (1024 bit key sizes or better), providing user authentication and data integrity checks.

Widespread acceptance and availability of standardized, digital signature and identification software would resolve the repudiation issue. Such software could be strong enough to assure that documents signed in one year would be secure for many years to come. Courts and businesses would have a known and stable platform on which to base their respective legal and business decisions.

The US Secretary of Commerce has blamed both industry and law enforcement for the failure to find a reasonable compromise between the need to monitor criminal activity and the need to offer consumers strong security for on-line transactions. As the national interest supports reaching a compromise, the government should actively encourage the development of an acceptable, international digital signature and identification standard by a trusted implementer.

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by Jim Carroll

ELECTRONIC COMMERCE AND THE PAPERLESS ECONOMY

L'Internet sera l'épine dorsale de l'économie du XXIe siècle. Il reliera l'ensemble des systèmes informatiques et des puces d'ordinateurs à travers le monde. Or, le commerce électronique est une extension logique et inéluctable du rôle des ordinateurs au sein de l'économie, les transactions sur papier cédant graduellement le pas aux transactions électroniques.

It is one of those phrases that seems to have suddenly appeared on the scene, and which is used in almost reverent tones by the "digerati." The truly trendy use the phrase "e-commerce," while IBM has gone so far as to customize it to the more palatable word "e-business."

Even given the sudden prominence of the concept, I find that many executives seem to be either mystified or skeptical of the concept of e-commerce. For many, it is yet another complex invention by the so-called "gods" of the computer revolution, one that is worthy of the disdain of those who have been burned by so many ill-fated computer promises of the past. For others, the unrelenting hype that surrounds the concept means that it is simply another tantalizing opportunity that will go the way of so many magical promises of the past. There is little appreciation among the executive crowd, even given the incessant focus on the topic Internet, as to what electronic commerce is really all about.

To me, the whole concept of e-commerce is quite simple — it is merely but the second phase of mankind's relationship with computer technology. The first phase,